The work in Animal Nutrition is being continued in accordance with the project already approved. Plans for a conference of the collaborators of this project have been formulated and the Committee will meet for a special conference early this fall. The work is proceeding satisfactorily.

The Committee on Zoology has been cooperating with the Department of Agriculture in calling attention to the methods of destroying rats and mice to prevent their depredations on stored food products. Through the Council of National Defense an urgent appeal is being sent to all State Councils to utilize the valuable methods recommended by the Department of Agriculture to fight this pest.

The Division is cooperating with the Division of Geology and Geography in gathering information from various colleges in the country as to modifications of courses of instruction to meet war conditions.

MINUTES OF JOINT MEETING OF THE EXECUTIVE BOARD AND THE COUNCIL OF THE NATIONAL ACADEMY OF SCIENCES

AT THE NATIONAL RESEARCH COUNCIL BUILDING, SEPTEMBER 9, 1918 AT 9.50 A.M.

Present: Messrs. Abbott, Dunn, Gregory, Hale, Howe, Johnston, Kellogg, Lester, Manning, Mendenhall, Millikan, Noyes, Pearce, Pupin, Stratton, Yerkes, and by invitation Durand, Flexner, and Gunnell.

The minutes of the preceding meeting, and of the intervening meetings of the Interim Committee, having been circulated by mail, were approved.

In considering the request of Dr. Schuster of the Royal Society as to the utility of the International Catalog of Scientific Literature, Mr. L. C. Gunnell described the present organization of the International Catalog and the difficulties under which it has been operating since the war began.

Mr. Noyes *moved:* That, before continuing the publication of the International Catalog, full consideration be given to the practicability of securing coöperation and avoiding duplication in the whole field, including the preparation of indexes, bibliographies, and abstracts of scientific literature. (*Adopted.*)

Moved: That the Chairman of the Research Council, Mr. Hale, act as a member and Chairman of the Research Information Service. (*Adopted.*)

Moved: That in the absence of the Chairman, Mr. Noyes, Mr. Merriam act as Chairman of the Division of General Relations and Mr. Johnston as Chairman of the Committee on Nitrate Investigations. (*Adopted.*)

Moved: That a Budget Committee of three be appointed by the Chairman to take charge of the accounts of the National Research Council. (*Adopted.*)

The Chairman appointed the following Committee: John Johnston, Chairman, Whitman Cross, R. S. Woodward.

Mr. Hale *moved:* That a small local committee on submarine research work be appointed in California, with headquarters at Pasadena, with Professor Harris J. Ryan, of Stanford University, as Chairman. (*Adopted.*)

The Chairman, Mr. Hale, asked for a discussion of the plans suggested for consideration by the Inter-Allied Conference, to be held in London on October

9 at the request of the Royal Society of London, for the benefit of the delegates present at this meeting.

The meeting adjourned at 12 o'clock.

PAUL BROCKETT, *Assistant Secretary.*

There is appended hereto a brief statement of the activities of some of the Divisions of the National Research Council.

Division of Engineering.—The Section of Mechanical Engineering is carrying on its work in its Pittsburgh machine shop and has increased its personnel slightly. It is engaged on problems concerned with the development of a number of devices for the use of aircraft, of special balloons and parachutes, of mechanism for the control of trucks and tractors, and is undertaking a general investigation of fatigue of metals.

The work of the Section on Prime Movers on the special engine has been suspended for lack of funds; a special carburetor is being developed.

In the work of the Section on Metallurgy on manganese saving, cooperation has been established in the investigations which they will make jointly with the Bureau of Standards and the Bureau of Mines; and already ten of the thirteen important smelters of manganese ore and eleven out of the sixteen open hearth steel works approached, have promised to cooperate.

A committee is being formed to recommend the proper procedure in making and treating steel ingots for the better class of uses such as cannon, crank shafts, shells and armor. A second committee will take up the question of devising a pyrometer capable of measuring the temperature of the molten steel in open hearth and electric furnaces. Experimental work on the pressing of steel of various compositions into helmets has been begun.

Division of Physics, Mathematics, Astronomy and Geophysics.—A considerable fraction of the problems which are catalogued under the activities of the Physical Science Division of the National Research Council are associated with the work of the Science and Research Department of the Bureau of Aircraft Production. This work is at present carried on by about twenty officers and an equal number of civilian employees of scientific and technical qualifications, in addition to some hundred and twenty enlisted men. This does not include the 500 men who carry on in this country and abroad the work of the Meteorological Service of the Army, which is one of the sections of the Science and Research Department.

The work in this country is carried on at Washington, Langley Field, Baltimore, Pittsburgh, at a number of universities, and at several aviation fields. At Langley Field there is a laboratory which employs some thirty officers and men and keeps some ten airplanes continuously engaged on experimental work. At Washington there are some seventy enlisted men working at the Bureau of Standards under the direction of the officers of the Science and Research Department aided by the officers of the Bureau of Standards. At Bal-

timore there are a dozen or more men working on signalling and balloon problems under the general direction of Major Wood. At Pittsburgh, where the shops of the Carnegie Institute of Technology have been turned over to the work of the Physics and Engineering Divisions of the National Research Council, there are a dozen or more physicists, engineers, and mechanics working upon the design and construction of apparatus. At Columbia University there are some five or six men working on a special and important problem. Since the final testing is done under the authority of the Division of Military Aeronautics there are always a number of men who are at the aviation fields assisting in the making of final acceptance tests.

The work of the Science and Research Department outlined above covers the problems which come under the authority of the Bureau of Aircraft Production, the Division of Military Aeronautics, and the Signal Corps; but, through the activity of the Physics Committee of the National Research Council, investigations have been initiated which come within the authority of other Bureaus of the Army and the Navy.

Thus, the whole sound ranging work, the investigation of the location of aircraft by sound, and certain other allied investigations were transferred to the authority of the Engineers Corps after they had been gotten well under way by representatives of the Research Council. These representatives still act as an integral part of the groups, and the results of the investigations are reported by the Engineers Corps to the central office of the Research Council; so that the Division of Physical Sciences of the Research Council is still acting in an advisory and stimulating capacity in all these fields, and the problems themselves are discussed in the executive committee meetings of the Division of Physical Sciences.

The Anti-Submarine group, of New London, furnishes another illustration of the way in which these developments take place. The ten scientific men constituting this group were chosen in June, 1917, and their activities financed for a number of months by the Research Council, but the funds for their research work are now supplied entirely by the Navy. The reports of the results of this work are made, however, to the National Research Council, and the Executive Committee of the Division of Physical Sciences is represented in the New London meetings which are held each week.

Precisely similar relations are held in regard to certain problems coming under the authority of the Bureau of Ordnance of the Navy, the Ordnance Department of the Army, and the Coast Artillery Board.

The Executive Committee of the Division of Physical Sciences has met but twice during the past month. It has added a number of new problems to the list of approximately eighty which are receiving the attention of this Division.

Mr. E. F. Nichols, who is Chairman of the Committee on Submarine Mines of the Physics Division, has been employed by the Bureau of Ordnance of the Navy for the fuller development and production of devices relating to Naval Ordnance.

Division of Chemistry and Chemical Technology.—In addition to the regular meetings on Wednesday and Friday mornings the Division held a special evening meeting on August 28 for the purpose of discussing the arrangement of courses and recommending curricula for the war training of chemists and chemical engineers; this conference was attended by practically all of those now resident in Washington who are especially interested in chemical education. This matter had been referred to a special committee, the active memers of which were H. P. Talbot and E. W. Washburn, who as a result of a questionnaire, had drawn up sample curricula designed to fit the special conditions now obtaining. It was found that the additional chemists required in the near future for government work will exceed 2000, with the probability that the needs for industrial work will be equally large. Analysis of the government requirements shows that about one-third of the number will need only training sufficient to enable them to carry out routine analytical and control work; the remainder will require a good general training with some degree of special training in one of the following: (a) physical chemistry, including electrochemistry and metallography; (b) organic chemistry, explosives in particular; (c) food and sanitary chemistry; (d) physiological chemistry; (e) chemical engineering. In accordance with the requirements two curricula, one for chemistry and one for chemical engineering, were proposed, for the purpose of training men needed as rapidly as possible; and after detailed consideration and discussion, two such sample curricula were recommended to the special committee of the War Department in charge of the whole matter.

The work of discovering chemical problems arising out of the war and assigning them to men at the universities and colleges is growing rapidly. To date thirty-four problems have been formulated, most of which have already been assigned, with the understanding that the research work will be prosecuted actively and that frequent reports of progress will be submitted to the Division. The list of subjects cover a wide range, from questions connected with chemical warfare to questions of conservation of materials a shortage of which is imminent.

Division of Geology and Geography.—In the absence of Messrs. Merriam and Cross, Mr. Gregory has acted as Chairman of the Division and also of the Section on Relations with Educational Institutions and State Committees. The chief work of the Division during August has been as follows:

1. Conferences with the Committee on Education and Special Training of the War Department with regard to plans for instruction in geology and geography for Army Training Units.

2. Conferences with geographers located in and near Washington with regard to geological instruction in universities and Army Camps during the period of the war.

3. Preparation of text books on Military Geology and Topography, Introductory Meteorology, and a syllabus on the Geography of Europe. Intro-

ductory Meteorology, a book of about one hundred and fifty pages, has been written largely by officers of the United States Weather Bureau. In the preparation of Military Geology and Topography the Acting Chairman has had the assistance of geologists and geographers in Government Bureaus and in universities.

4. Suggestions for training in map making and map interpretation in Army Camps, prepared largely by Mr. C. P. Berkey of Columbia University, have been submitted for discussion.

MINUTES OF THE MEETING OF THE EXECUTIVE BOARD

AT THE NATIONAL RESEARCH COUNCIL BUILDING OCTOBER 8, 1918, AT 9.45 A.M.

Present: Messrs. Bogert, Cross, Dunn, Howe, Merriam, Millikan, Rous, Washburn, and Woodward.

The minutes of the preceding meeting, and of the intervening meetings of the Interim Committee, having been circulated by mail, were approved.

Mr. Dunn *moved:* That the following elections by the Interim Committee for membership in the National Research Council be recommended to the President of the National Academy of Sciences for appointment as members of the Council: Vice Chairmen, W. J. Lester (Engineering Division), E. W. Washburn (Division of Chemistry), Peyton Rous (Division of Medicine), and A. F. Woods (Division of Agriculture), together with C. E. Munroe, Chairman of the Committee on Explosives Investigations, and W. H. Howell, Acting Chairman of the Physiology Committee. (*Adopted.*)

Moved: That the whole matter of membership in the National Research Council be considered at a later meeting of the Board, at which time fuller information as to the appointment of members and recommendation for further appointment will be presented. (*Adopted.*)

Moved: That the election of the following as members of the Section on Industrial Research be confirmed: John Johnston, Chairman, L. H. Baekeland, G. K. Burgess, F. G. Cottrell, A. D. Flinn, C. E. K. Mees, Walter Rautenstrauch, W. R. Whitney. (*Adopted.*)

Moved: That the election of the following as members of the Advisory Committee of the Division of General Relations be confirmed: Theodore N. Vail, Chairman, Cleveland H. Dodge, George Eastman, E. H. Gary, A. W. Mellon, Pierre S. duPont, H. S. Pritchett, E. W. Rice, Jr., Elihu Root and Ambrose Swasey. (*Adopted.*)

Moved: That Peyton Rous be appointed Vice Chairman of the Division of Medicine and Related Sciences, in place of Major Yerkes resigned, and that he also be considered a member of the Executive Committee of said Division. (*Adopted.*)

Moved: That the pamphlet showing the present war organization of the Council be printed as of the present date. (*Adopted.*)

Moved: That the work of the National Research Council is of such importance to the Government that request might be made for deferred classification of men indispensable to its work; that office employees not engaged in research could not be considered as indispensable; and that cases of married men with families should be allowed to rest on the statement of the questionnaire, unless special circumstances make necessary a request for exemption. (*Adopted.*)

Moved: That the action of the Treasurer of the National Academy of Sciences in investing funds of the National Research Council, on deposit with the National Academy of Sciences, in readily negotiable bonds, be approved. (*Adopted.*)